PATENT

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IN THE CLAIMS:

Please find below a listing of all of the pending claims. The statuses of the claims are set forth in parentheses.

1. (Original) A magnetic random access memory (MRAM) device comprising:

an array of magnetic memory cells;

a plurality of word and bit lines connecting columns and rows of the memory cells so that the memory cells are positioned at cross-points of the word and bit lines, each memory cell having a magnetic reference layer and a magnetic data layer, each magnetic reference layer and each magnetic data layer having a magnetization that is switchable between two states under the influence of a magnetic field, each reference layer having at a first temperature a coercivity that is lower than that of each data layer at the first temperature, and

a plurality of heating elements each proximate to a respective data layer, each heating element in use providing for localized heating of the respective data layer to reduce the coercivity of the data layer so as to facilitate switching of the data layer.

2. (Original) The MRAM of claim 1, wherein:

in use the coercivity of each heated data layer is higher than that of each reference layer.

3. (Original) The MRAM of claim 1, wherein:

in use the coercivity of each heated data layer is lower than that of each reference layer.

4. (Original) The NRAM of claim 1, wherein:

each heating element is a heat-inducing layer.

5. (Original) The MRIN of claim 4, wherein:

each heat-inducing layer is a resistive layer.

6. (Currently Amended) The MRAM of claim 5 wherein:

the resistive layer comprises at least one [[of]] of the materials Si, Ge, Sc, C, SiC, TaO_2, WSi, CoSi, FeSi, PtSi, TaN, FcAlN and SiN.[[6.]]

7. (Original) The MRAN of claim 4, wherein:

each heat-inducing layer is a dielectric layer through which in use a tunneling current is directed.

8. (Original) The MRAM of claim 7 wherein:

the dielectric layer comprises at least one of the materials Al_2O_3, AlN, SiO_2, $S1_3N_4$, BN, MgO and Ta_2O_5.

9. (Original) The MRAM of claim 1, wherein:

each heating element is a diode.

10. (Original) The MRAN of claim 9, wherein:

the diode comprises at least one of amorphous silicon and single crystalline silicon.

11. (Original) The MRAM of claim 1, wherein:

each memory device is a tunneling magneto-resistance (TMR) memory device.

12. (Original) A computer system comprising:

a central processing unit,

a main board coupled to the central processing unit and magnetic memory devices coupled to the main board, each magnetic memory device comprising:

an array of magnetic memory cells;

a plurality of word and bit lines connecting columns and rows of the memory cells so that the memory cells are positioned at cross-points of the word and bit lines, each memory cell having a magnetic reference layer and a magnetic data layer, each magnetic reference layer and each magnetic data layer having a magnetization that is switchable between two states under the influence of a magnetic field, each reference layer having at a first temperature a coercivity that is lower than that of each data layer at the first temperature, and

a plurality of heating elements each proximate to a respective data layer, each heating element in use providing for localized heating of the respective data layer to reduce the coercivity of the data layer so as to facilitate switching of the data layer.

13. (Original) A method for operating an MRAN device, the MRAM device comprising an array of MRAM cells which are switchable between two states under the influence of a magnetic field, each MRAN cell comprising a reference layer and a data layer, the method comprising the steps of:

heating at least one data layer; and

utilizing the generated heat to reduce the coercivity of the at least one data layer so as to facilitate switching of the at least one data layer.

14. (Original) The method of claim 13, wherein:

the step of heating the at least one data layer comprises directing a current through a heat-inducing layer.

15. (Original) The method of claim 14, wherein:

the step of heating the at least one data layer comprises directing a current through a resistive heat-inducing layer.

16. (Original) The method of claim 14, wherein:

the step of heating the at least one data layer comprises directing a tunneling current through a dielectric layer.